

RECREATION SPECIALIZATION AND THE RECREATION OPPORTUNITY
SPECTRUM: A STUDY OF CLIMBERS

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ABSTRACT

Recreation Specialization and the Recreation Opportunity Spectrum: A Study of Climbers

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The purpose of this study is to match the appropriate setting opportunities with the level of recreation specialization of selected climbers, using the Recreation Opportunity Spectrum (ROS) as a model of different setting opportunities. Questionnaires were distributed and analyzed to create a specialization index level. Associations with setting variables were analyzed using Kendall's tau-b correlation and model selection loglinear analysis. Of the relationships examined, four variables were significant using Kendall's tau-b and two using model selection ($\alpha = .05$). These results show that the setting becomes more important as specialization increases and that more specialized climbers tend to go to more areas than less specialized participants. The study also showed that access to the area and management of the climbing setting become more important as a climber increases their specialization level. These factors are significant for managers, because it suggests a difference in setting preferences based on specialization levels of climbers.

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INTRODUCTION

In the past few years, risk recreation activities have been growing exponentially, especially in the sport of rock climbing. With the advent of indoor climbing gyms and bolted rock climbs, the sport has become more accessible and safer to the general population. It is estimated that there are over 300,000 Americans who participate in climbing related activities, with an annual increase of 12 percent (Waldrup & McEwen, 1994). The increasing numbers have placed a higher level of strain on climbing areas and the managers who control these areas. Because of a larger and more diverse group of climbers recreating, managers will continue to be challenged to control these areas while trying to take into account the different types of needs. On the other hand, climbers will be looking for high quality areas that provide a certain level of enjoyment and satisfaction that matches their level of expertise when choosing where to climb.

The purpose of this study is to examine climbers by categorizing them into different groups based on certain commonalities and studying the setting preferences of these groups using a land classification scale.

Nature of Problem

This study examines how classification of recreation users can be used to determine setting preferences. In the early years of research in outdoor recreation, classification of participants engaging in an activity were referred to as the "average user" (Shafer, 1969). An example of this would be averages of studies examining any climber who has ever climbed, regardless of experience level or other factors that currently distinguish recreation participants.

During the post-World War II boom in recreation that occurred in the United States, a more complex range of activity preferences began emerging in outdoor research. Shafer (1969) dismissed the idea of the "average user" and suggested that recreationists be classified according to their differing behaviors, attitudes, and beliefs. This would allow land managers to provide more recreational opportunities. Providing multiple opportunities for outdoor recreation will better meet the needs of a growing number of recreationists and their preferences.

A study by Bryan (1977) examined a new way to categorize recreation participants by using differences in behaviors from general to specific. This method of categorization became known as recreation specialization

and is used in this study to categorize climbers based on those behaviors.

Purpose of Study

The purpose of this study is to match the appropriate setting opportunities with the level of recreation specialization of selected climbers. This study is meant to determine what type of relationship there is between recreation specialists and the setting. Managers need more information on recreation users and their preferences to help them manage the opportunities that they can control.

Recreation specialization (Bryan, 1977) is a method of categorizing participants in an activity according to differences in behavior that occur as novices progress to a level of expertise. This type of participant classification has been used in many studies (e.g., Bryan, 1977; Hammitt, McDonald, & Noe, 1984; McIntyre & Pigram, 1992) and has been proven to be an effective tool for managers to use in providing opportunities for different levels of recreation specialists.

Need for Study

This study examines the use of recreation specialization on rock climbers and its effect on the setting, using the Recreation Opportunity Spectrum (ROS) as a model of different setting preferences. This study fills

a need of looking at climbing specialization from a land classification aspect. As such, it provides a unique view as to how one type of land classification used by land managers correlates to differing levels of recreation specialization. In addition, by identifying the diverse preferences of climbers, this study contributes to a better understanding of behavior patterns among rock climbers.

This study also increases the amount of information on climbers and their setting preferences, which can be used to create better opportunities for climbing. Essentially, in using the information created by the present study, it allows managers to diversify the amount of climbing areas available to recreation users. Finally, the study identifies a need for information that would allow managers to make more effective decisions that enhance the quality of recreation experiences and resource conditions of climbing areas.

In the following chapters, this thesis presents the relevant literature, research hypotheses, research methodology, results, and conclusions.

CHAPTER ONE: LITERATURE REVIEW

This chapter will provide an over-view of research that is relevant to the present study. The first section will discuss the beginnings of research on recreation specialization. It will then categorize the research on specialization into three distinct components: (1) psychological, (2) cognitive, and (3) behavioral. The chapter concludes by providing a more in-depth look at the behavioral component of specialization by examining setting preferences using the ROS as a model of setting choices for the recreation participant.

Recreation Specialization

Recreation specialization is one method used by researchers to assist managers in identifying, describing, and planning for different recreational needs. Bryan (1977) developed the theory of recreation specialization as a means to better understand differences in attitudes and behavior patterns in participants of an outdoor activity. Bryan defines specialization as it "refers to a continuum of behavior from the general to the particular, reflected by the equipment and skills used in the sport and activity setting preferences" (p. 175). As applied to climbing, the theory suggests that climbers progress across the continuum

over time, beginning with a general interest in the activity and, over time, they progressively focus more on the activity to the point where they have more specific requirements for satisfaction. Bryan tested his theory of specialization with trout anglers and found that the continuum of trout anglers went from occasional anglers who prefer using basic equipment to catch fish to technique-setting specialists, who prefer more specific equipment/technique and settings.

Specialization has been used in the past twenty years by recreation professionals (e.g., Bryan, 1977; Hammitt, McDonald, & Noe, 1984; McIntyre & Pigram, 1992) to explain progressive and predictable patterns of change in participation by the recreation participant over time. Because specialized individuals have different needs than novices, classification of recreationists based on specialization enables managers to match specific preferences and behaviors with setting attributes that can be manipulated to facilitate quality opportunities (Ewert & Hollenhorst, 1989). As the level of specialization increases, participants become more particular about setting preferences and are more dependent upon the natural qualities of the managed resource (Bryan, 1977; Hammitt, McDonald, & Noe, 1984; Schreyer & Beaulieu, 1986). For

example, more specialized individuals are more sensitive to crowding (Graefe, Donnelly & Vaske, 1986; Hammitt, McDonald, & Noe, 1984), managerial constraints (Wellman, Roggenbuck, & Smith, 1982), and the problems managers face in dealing with these issues.

Measurement of recreation specialization involves the use of many different variables. Typically, measurement of specialization uses a multiple item index instead of using a single item scale. The use of a multiple item scale is often called the specialization composite index. The indicators typically measured in the index for specialization can include items such as experience use history, which is the measurement of experience gained over time, social contexts, expenditures, equipment, commitment and involvement, centrality to lifestyle, expertise, and environmental setting preferences (Wellman, Roggenbuck, & Smith, 1982). These measurements can be broken up into three different components of specialization: (1) the Psychological Component, (2) the Cognitive Component, and (3) the Behavioral Component (Little, 1976). Each of these components are independent of one another, but they can interact and potentially reinforce the other.

Psychological Components of Specialization

One of the measurements of specialization involves the psychological aspects of recreation. The psychological components of specialization include involvement and commitment in the activity and centrality to the lifestyle of the recreation participant. This type of research has been among the most explored aspect of recreation specialization literature.

Graefe (1980) for example, looked at the relationship between the level of participation and the degree of involvement and commitment among recreational anglers. He found that those who are more specialized are much more involved and committed to angling than those who are less specialized. Graefe (1980) found that not only those engaged in very specific aspects of the sport of fishing could be specialists, but also those who engage in generic aspects of fishing could be considered specialists if their level of involvement, participation, skill, and settings are consistent with those specific specialists, such as fly fishermen.

Another aspect of the Graefe (1980) study was that social interaction resulting from an activity tends to be higher among more specialized anglers. Thus, those anglers who watch fishing shows, go to fishing tournaments, and

join fishing clubs, generally were higher specialists than the anglers who didn't have such social interaction with fishing.

A study of canoeists in Virginia by Wellman, Roggenbuck, and Smith (1982) used measures of involvement and centrality of an activity to the participant's lifestyle to determine the level of specialization, which was then used to examine norms of depreciative behaviors. The variables were combined to create a specialization index, upon which the user can be identified along the continuum of specialization. Wellman et al.'s study found that involvement and centrality to life could be used to create an index to determine the level of specialization among participants. Those individuals who were more involved in canoeing and felt it was a very important part of their lifestyle, generally were more highly specialized than those participants whose level of commitment and involvement were lower. However, the results of the study did not show much difference in determining socially appropriate behavior among canoeists of varying levels of specialization.

McIntyre and Pigram (1992) looked at the level of specialization and how it affects enduring involvement in vehicle-based camping. The study attempted to develop a

construct called recreation involvement, which included measures of experience use-history and enduring involvement, to reexamine how to measure recreation specialization. Upon examining vehicle campers, McIntyre and Pigram's (1992) results suggest that those who had a higher degree of recreation involvement were more specialized, and thus were more sensitive to management action regarding changes to a particular area for vehicle-based camping. They found that level of involvement in an activity is a very important category for determining the level of recreation specialization and that as a whole, the affective (or psychological) component of recreation specialization is an important cog to viewing specialization comprehensively.

Schuett (1993) examined ways to determine the level of involvement of white water kayakers. He used measures of skill, participation, experience, social orientation, environmental preference, psychological outcomes, perceived risk, locus of control, and sensation seeking to predict enduring involvement. The study found that the level of enduring involvement could be predicted by skill level, psychological outcomes, gender, frequency of participation, and perceived risk. If a recreation participant has a high skill level, frequency of participation, low perceived

risk, and a positive psychological outcome, then the potential for high enduring involvement is likely. Gender is not used as a variable in determining the level of involvement for specialization.

A recent study by Scott and Shafer (2001) re-examined recreation specialization and its intended purpose and potential uses. Scott and Shafer (2001) indicated through conversations with Bryan (1977) that recreation specialization is a developmental process of progression, instead of an indicator of intensity of involvement. This study attempts to view recreation specialists in that framework, categorizing climbers along this process, rather than using the level of involvement as a primary factor in determining the level of specialization.

Cognitive Components of Specialization

The cognitive variables of specialization are another important aspect that has received attention from a number of studies. The cognitive components are those items gained over time, such as skill, expertise, or knowledge. This has often been defined as the attachment one develops to a leisure activity in the progression from novice to expert (Kuentzel & Heberlein, 1997).

Hollenhorst (1989) examined specialization in rock climbers. He examined the use of skill (expertise) as an

alternative measurement of specialization, rather than a multiple-item index. The study examined the idea that the measurement of expertise can provide an effective measurement of specialization, regardless of other factors, such as enduring involvement and experience. The results of his study found that expertise levels were highly congruent with many of the other variables used to measure specialization, especially frequency of participation. However, there was little correlation between expertise and naturalness of the site, age of participants, and the amount/costs of equipment. In conclusion, Hollenhorst found that in activities that employ a difficulty rating system, such as climbing or whitewater kayaking, researchers and land managers can use expertise as a simple and effective measurement to categorize recreation participants.

Kuentzel and Heberlein (1997) looked at self-development in the process of sailing specialization. Self-development in this study was defined as increasing skill and developing knowledge of the recreation activity. They wanted to see if specialization in sailing followed a self-development linear continuum from novice to expert, or if it followed a social context, where the social setting affects where the participant begins in regard to

specialization. Their results found that specialization in sailors followed along the linear continuum as defined by Bryan (1977) and was not based on social status. That is participants often follow a continuum of skill and knowledge from novice to expert, based on increasing the knowledge and skills of the participant.

Behavioral Components of Specialization

The third component of specialization is the behavioral aspect of specialization. The behavioral aspect includes variables such as level of experience, amount of equipment, type of activity, and the recreation setting. The study of the behavioral aspects of specialization is the most explored area of specialization research, especially experience and specialization.

The use of experience has often been used in research to differentiate recreationists. Hammitt and McDonald (1983) studied floaters on three Southeastern rivers in the United States. They developed a multi-item experience index from four dimensions of river recreation experience. They looked at the number of years floating, frequency of river floating, frequency of floating on the study river, and total number of trips on the study river. Their results found that more experienced visitors to the recreation site were more sensitive to environmental

disturbances that occur on the river and were more supportive of management of the river recreation resources. This indicates that more experienced users tend to be more aware of the environmental setting around them and the changes that occur in the setting over time.

Another study looked at how the amount and type of experience affects his/her attitudes, preferences, and behaviors of the individual (Schreyer, Lime & Williams, 1984). This study created an index using three variables of experience in a study of river recreation to form a composite measure called Experience Use History (EUH). From the development of EUH, six different types of recreation participants was identified based on the total number of river trips, number of trips on the study river, and the number of different rivers the participant has used. Categorization of the study participants ranged from novices (for example, those who have never taken a trip down any river) to veterans (those who have had multiple trips down many rivers and several trips down the study river). Schreyer et al.'s (1984) findings showed significant differences in motivations, level of perceived conflict, and attitudes towards management practices among the six types of participants. This study seems to

indicate that the amount and type of experience is important in determining level of experience.

There have been several studies examining specialization and setting preferences. Bryan (1977) found that more specialized trout anglers preferred settings that were more particular. For example, they might prefer limestone fed streams with low use. Those with low specialization were found to be less likely to prefer more individualized streams and preferred to fish at areas where they are more likely to catch fish. Bryan (1977) found that resource orientation is an important factor in the theory of specialization, just as important as equipment and skill levels of the participant.

Other studies have looked at specialization as a factor in setting preferences. Virden (1986) also looked at recreation specialization and motivations on the environmental setting preferences of backcountry hikers. This study found significant relationships between the level of specialization and the type of environmental setting preferred by hikers. A total of 55 percent of all setting attributes exhibited significant relationships with specialization, especially in the physical and managerial setting domains. In the physical setting domains, specific psychological outcomes such as autonomy, exercise,

achievement, and nature became more important as a hiker became more specialized. The managerial setting domains, however, could not be explained using the setting attributes identified as having a significant relationship with specialization. However, this research implies that specialists have more exacting physical setting demands, allowing managers and researchers to better understand the motivations of some recreation participants.

Virden and Schreyer (1988) examined specialization and importance of physical, social, and managerial setting attributes for backcountry recreation opportunities. This study used a specialization composite index and developed thirty-eight setting attributes to study in three western US wilderness areas. The finding showed that in twenty-one of the thirty-eight setting attributes, specialization had some statistical significance in the study. Virden and Schreyer (1988) found that the study "offers support for the premise that specialization reflects the value and preference in certain types of environments" (p. # 737).

Williams and Huffman (1986) looked at recreation specialization as a factor in backcountry trail choice. Their study looked at how specialization affected backcountry trail choice by using trail information as an effort to redistribute backcountry trail use. They used a

13-item specialization scale and compared them with 20 different setting attributes. The results of their study were mixed in that backcountry specialists sought out more information on trails. The study also indicated that specialist have a preference for more challenging trails than novices. However, the sampling frame of the study was limited to recreation specialists engaging in a particular type of activity and not examining a general specialization in any related outdoor activity. This limitation can make it difficult to generalize the study findings beyond specific activities.

Climbing Specialization and Setting Preferences

The specialization and setting research presented thus far have primarily been limited to activities such as fishing, boating, etc. Considering the research presented in this thesis focuses on rock climbers, it is especially important to review research that more specifically relates to rock climbing specialization and setting preferences.

Hollenhorst (1989), for instance, conducted a study of specialization on climbers that looked at the effect of expertise as a measure of specialization on setting preferences. This study primarily looked at the use of expertise as an attribute of measurement for specialization in climbers. The author concluded that expertise affects

where a person climbs because of density of climbers in the area. The study also found that experts were not as likely to prefer more natural areas than those who were considered novice. However, the use of the other components of specialization as described by McIntyre and Pigram, (1992) was not taken into account in where participants prefer to recreate. Therefore, there is a need for study into whether specialization using all three components plays a role in setting preferences for climbers.

Another study on climbing specialization examined how it affects setting and route attributes of climbers (Merrill & Graefe, 1997). This study looked at how the level of specialization affects what specific setting and route attributes climbers prefer and also whether climbers prefer attributes related to the route or the general recreational setting. Merrill and Graefe, (1997) collected data at Seneca Rocks National Recreation Area, an area also used in the present study. A multi-item specialization index was used to measure specialization or group visitors into categories reflecting different levels of specialization. Respondents were asked to report the physical attributes of the climbing route and the type of activity in the area using a Likert scale, which uses numbers to indicate the best described answer for the

respondent (i.e. 1=strongly agree and 4=strongly disagree). The highest quartile respondents of the specialization index were classified as high specialists and the lowest quartile respondents were classified as low specialists. The different specialists were then compared with their responses for specific physical attributes to note any differences between the two groups. The results indicate that as specialization increased, specific setting and route attributes became more important for climbers. Merrill and Graefe (1997) also found that all climbers are more concerned about the specific route versus the general setting, meaning that management of specific routes is more important to climbers than how the entire climbing area is managed.

Recreation Opportunity Spectrum (ROS)

When examining specialization, the setting plays an important role in differentiating the different levels of specialization. As part of the behavioral component of specialization, the setting is an important consideration for managers to understand. Managers can manipulate setting opportunities to meet the setting preference levels of the recreation area users.

Among all outdoor recreation participants, there is a wide range of needs for recreational setting opportunities.

Historically, research that has examined participants has looked at what is described as the "average participant" (Shafer, 1969). However, this type of research does not take into account the various needs for different recreation settings by recreation participants.

Many different classification models have been used over the years to define the diverse recreation opportunities available. One conceptual guideline that has been used widely by land management agencies is the Recreational Opportunity Spectrum (ROS) (Brown, Driver, & McConnell, 1978) which was established to take into account the different settings used by recreationists, based on physical, social, and managerial components.

The ROS is based on propositions that state, "Recreation experiences are influenced by the settings in which recreation activities occur, settings are defined by environmental, social, and managerial conditions and that combinations of those conditions can be used to create a diversity of recreation opportunities" (Brown et al. (1978, p.74). Brown et al. (1978) also defined six setting classes to envelop the range of recreation setting opportunities. The different classes include (1) Primitive, (2) Semi-primitive non-motorized, (3) Semi-

primitive motorized, (4) Rustic, (5) Concentrated, and (6) Modern urbanized.

The six ROS classes have different physical, social, and managerial setting component characteristics. A set of five mapping criteria (or factors) helps define the physical, social, and managerial setting components of each ROS class (Brown et al., 1978). Remoteness, size, and evidence of humans define the physical setting component. User density defines the social component. Management regimentation and noticeability define the managerial component.

These criteria are used for mapping the forest into the six ROS classes. At one end of the spectrum, for example, the Primitive ROS class is generally defined as an area at least 3 miles from all roads, railroads, or trails with motorized use (remoteness); 5,000 acres or larger (size); unnoticeable evidence of humans in an unmodified natural environment (evidence of humans); less than 6 parties encountered per day (social setting); and on-site regimentation is low (managerial setting). On the other end of the spectrum, the Urban ROS class does not have remoteness and size criteria, but it does define a setting that is dominated by structures (evidence of humans), large

numbers of users (social setting), and obvious and numerous levels of regimentation and controls (managerial setting).

The five criteria for ROS classes (remoteness, size, evidence of humans, social setting, and managerial setting) are important aspects of ROS factors. The ROS classes consist of five major factors of the ROS scale: (1) naturalness of the area, (2) access to the recreation site, (3) contact with other people, (4) amount of management and regulation, and (5) amount and type of facilities.

The naturalness of the area is a scale from an undisturbed natural area with no evidence of humans to an area where roads, buildings, and other human-made structures dominating the landscape. The access to the recreation site refers to how the user would approach the specific site, including motorized or nonmotorized trails, primitive roads, or roads accessible by all vehicles.

The third factor, contact with other people, refers to the amount of contact the recreation participant encounters in a single day at the recreation site, from little or no contact to constant contact with other people. Regarding the amount of management and regulation, areas along the ROS can range from no noticeable visitor regulations and management to obvious regulations and management with sophisticated information present. Finally, the amount and

type of facilities ranges from a few primitive facilities, such as trails and signs, to numerous facilities to accommodate many users. These five factors are incorporated together to provide a categorization of a recreation area along the ROS, from Primitive to Modern Urbanized.

Brown and Ross (1982) expanded on the ROS as defined by Brown et al. (1978) to include desired experiences by recreation participants to predict setting preferences. They examined the desired experiences, preferred settings and activities of visitors to the Glenwood Springs Resource Area in Colorado. More specifically, they examined the relationships between the desired experiences and preferences to ROS classes, which was the setting scale used in this study.

Brown and Ross's (1982) results indicate that desires for specific experiences were associated with preferences for settings as defined by the ROS and that homogenous groups of recreationists have a more uniform experience than all of the recreationists together. This suggests that specific recreation groups, such as climbers, may have more similar experience values than a group of hikers and kayakers, due to differences in desired experiences between different recreation activity groups. Overall, this

research shows that the ROS can predict setting preferences as they relate to setting opportunities.

Summary

This chapter discussed the beginnings of research on recreation specialization. It then broke down the research on specialization into three distinct components: (1) psychological, (2) cognitive, and (3) behavioral. The chapter concluded by providing a more in-depth look at the behavioral component of specialization by examining setting preferences using the ROS as a model of setting choices for the recreation participant.

CHAPTER TWO: RESEARCH METHODOLOGY

This chapter discusses the hypotheses proposed in this study. It also provides an overview of the study sites used in this thesis. This chapter also presents the data collection instrument, sampling procedures, and types of analysis used for the results of this study.

Hypotheses

In this study, there are five hypotheses based on the research questions addressed in the beginning of this study. These five hypotheses include:

- (H1) The Recreation Specialization index level has no significant association ($\alpha = .05$) with the Recreation Opportunity Spectrum (ROS) classes.
- (H2) The specialization index level of climbers has no association ($\alpha = .05$) with the number of different areas that a climber frequents.
- (H3) The importance of the setting to the participant has no association ($\alpha = .05$) to the specialization index level.
- (H4) There is no association ($\alpha = .05$) between the specialization index level and ROS factors, such as access to the area, amount of facilities present, naturalness of the area, contact with

other people, and the amount of management and regulations imposed by the management agency.

- (H5) There is no association ($\alpha = .05$) between individual effects of the level of climbing specialization and the corresponding individual effects of the setting preferences examined in this study.

Study Sites

In the Spring of 2001, climbers at three different climbing areas completed an on-site questionnaire about climbing and setting preferences. The three areas used in this study were the Seneca Rocks-Spruce Knob National Recreation Area in the Monongahela National Forest, the New River Gorge National Scenic River, and Cooper's Rock State Forest in West Virginia. The study used these areas because they represent a wide spectrum of recreational settings as defined by the Recreation Opportunity Spectrum (ROS) (Brown et al., 1978). In addition, they provided access for sampling climbers as they entered or exited the climbing area.

Seneca Rocks is a climbing area on the Monongahela National Forest in east-central West Virginia consisting of two 450-foot rock fins rising out of the landscape. The area was chosen for its representation of the Rustic aspect

of the ROS spectrum and also for the diverse opportunities afforded for traditional climbers, (climbers who place their own protection into the rock to protect against falls).

The New River Gorge National Scenic River is a climbing area in south-central West Virginia maintained by the National Park Service. It is a series of 100-foot cliffs surrounding the rim of the New River Gorge. The study used this area for its representation of the Semi-Primitive aspect of the ROS scale and to represent opportunities for sport climbing (climbing where participants use pre-existing protection permanently placed in the rock).

The third and final area used is the Cooper's Rock State Forest, which is located in north-central West Virginia. The area has many large boulders and small 40-foot cliffs along the edge of the Cheat River Canyon. The study used this area as a site because it represents both Rustic and Semi-Primitive ROS classes and provides opportunities for top-rope and bouldering activities; therefore, it allows more inexperienced climbers to use the area.

Study Instrument

A questionnaire was developed that measured the level of specialization and setting preferences for climbers (see Appendix A). The questionnaire developed contains questions to (A) determine the level of specialization, (B) determine personal climbing preferences, (C) determine setting preferences, and (D) examine participant demographics.

Questions pertaining to specialization were obtained from a study on specialization and canoeing (Kauffman & Graefe, 1984) and adapted to make the questions relevant to the study of climbers. The questions used for measuring specialization level include (A) years of climbing, (B) maximum number of days climbing per year, (C) value of equipment, (D) self-reported skill level (from novice to expert), (E) highest climbing level attained (based on Yosemite Decimal Scale, a scale of climbing difficulty from 5.0 [easiest] to 5.14 [most difficult]), (F) importance of climbing to lifestyle, and (G) participant's favorite outdoor recreation activity. These questions incorporate the cognitive, psychological, and behavioral aspects of recreation specialization. Responses to these questions were collected using various techniques. Some of the techniques used include (A) Likert scales, (B) ordinal

scales, (C) nominal response questions, (D) self-reported written responses and (E) checklists. The questions about years of climbing, maximum days climbing per year, value of equipment, and highest climbing level attained (by Yosemite Decimal Scale) were self-reported written responses, while the questions about self-reported skill level and the importance of climbing to the participant's lifestyle were four and five point Likert scales, respectively. The question about whether climbing was the participant's favorite outdoor recreation activity was a nominal (1=Yes and 2= No) response question.

Other questions used to determine personal climbing preferences include (A) involvement in climbing organizations, (B) reading of climbing media, (C) type of people the respondents prefer to climb, and (D) the type of climbing the participants prefer (such as sport climbing or mountaineering) (Kauffman & Graefe, 1984). The questions about involvement in climbing organizations and reading of climbing media were nominal (1= Yes and 2= No) response questions, while the questions about the people the respondents prefer to climb with and the type of climbing the participants prefer were checklists in which the respondent could check those items that applied to them.

Another set of questions was asked regarding setting preferences. The setting questions measured the climber's preferences for ROS classes, importance of setting when climbing, how many different areas the respondents climbed, and specific questions relating to factors of the ROS. The questions asked about ROS factors include (A) access to the area, (B) contact with other people, (C) naturalness of the area, (D) management of the area, and (E) the amount of facilities present. The questions about the ROS classes and its specific factors (such as access, naturalness, and management) were four and five point ordinal scales (with 1= Primitive to 4/5= Concentrated or Developed). The question about the importance of the setting was a five point Likert scale (1= Very Important to 5= Not Important) and the question asking how many different areas does the participant climb was an ordinal response list with three items (the same area, several different areas or many different areas).

Finally, demographic questions were asked to determine the population of the study and how that compares with previous studies of climbers (Kauffman & Graefe, 1984). These include questions such as (A) gender of participant, (B) education, (C) occupation, (D) income level, (E) marital status, (F) state or country of residence, and (G)

the size of community where the participant resides. These questions were primarily nominal responses and written responses.

Sampling Procedures

Data was collected during the Spring of 2001. I began the study by finding ideal locations to approach climbers as they were exiting the climbing area. I visited each site on different days of the week to collect information from those who climb during the week versus those who climb on the weekends. I asked all climbers over the age of 18 as they were exiting the climbing area to participate in a climbing study. The participants were then given a questionnaire and asked to fill it out completely while on-site. However, I told the participants that if there was a question that they found objectionable, they could leave the question blank. After the participants filled out the questionnaire, they handed it to me. I asked each participant whether they had questions regarding the study. At the end of the day, the questionnaires were coded for the area collected, and stored securely until they were entered into a database.

Analysis

After data collection, I coded and entered the data into a database and conducted statistical analysis using

SPSS. After the data was entered into a spreadsheet, I created an index of recreation specialization and analyzed the correlation between specialization and the ROS/setting variables.

I created a recreation specialization index using seven variables that measure aspects of the three major parts of recreation specialization, which are (1) cognitive, (2) psychological, and (3) behavioral. These variables include: (A) number of years climbing, (B) amount of days climbing per year, (C) dollar value of climbing equipment owned, (D) self-reported climbing level (from novice to expert), (E) highest climbing level attained (using the Yosemite Decimal Scale), (F) importance of climbing to the person's lifestyle, and (G) if climbing was the respondent's favorite activity (Wellman, Roggenbuck, & Smith, 1982).

I then ranked each of variables into quartiles on a case-by-case basis, as in the method used by Merrill and Graefe (1997). I gave a value of one to those cases of each variable that were in the highest quartile based on how a highly specialized person would respond. A value of two and three were given to those cases that were in the second and third quartile, respectively. Finally, I gave a value of four to those cases that were in the lowest 25

percent of each variable. In cases of variables with only two values, such as whether climbing is the respondent's favorite activity, then a value of one was given to the highest half and a value of three was given to the lowest half.

I then added each of these variables together on a case-by-case basis to create an aggregate score or index. A minimum aggregate score of seven (7 variables answered at 1= high) would indicate a high specialist, while a low score of 27 (6 variables answered at 4=low and 1 variable where 3= low) would indicate a low specialist. This aggregate score was then ranked again to create a specialization index (Merrill & Graefe, 1997). I ranked each score into quartiles, with the lowest scores, the most highly specialized, being given a value of one. The cases that were in the second and third quartile, the average specialized climber, I gave a value of two and three respectively, and the cases in the fourth quartile, the low specialized climbers, I gave a value of four. This created an index by which the level of specialization is determined based on the value from these ranked aggregate scores.

Approximately 43 respondents to the questionnaire were ranked as high specialists, 106 were classified as moderate specialists, and 58 were classified as low specialists.

The unequal distribution of specialists occurred because there are multiple cases with the same aggregate score at the cut-off point for each quartile. I then placed these cases in the next lower category of specialists, resulting in the unequal distribution.

The index was compared with ordinal variables that measured setting preferences and importance of the setting. These ordinal variables include: (A) setting preference of ROS classes, (B) importance of setting when climbing, (C) how many different areas to climb, and (D) specific questions relating to factors of the ROS. These specific factors included questions such as: (A) access to the area, (B) contact with other people, (C) naturalness of the area, (D) management of the area, and (E) the amount of facilities present. I then compared the specialization index to the ordinal setting variables using bivariate (Kendall's tau-b) correlation to determine the significance of each setting question with the level of specialization, with the significance tests using alpha (α) at .05. Kendall's tau-b was used as a nonparametric measure of association for ordinal or ranked variables that take ties into account. The sign of the coefficient indicates the direction of the relationship, and its absolute value

indicates the strength, with larger absolute values indicating stronger relationships.

I conducted additional analysis on recreation specialization and setting preferences using Model Selection Loglinear Analysis (SPSS, 1999). The Model Selection Loglinear Analysis procedure analyzes multiple dimension cross-tabulations. This procedure helps the researcher find which categorical variables are associated with one another using complete and partial associations and allows you to examine those relationships simultaneously. Partial associations are associations that allow the researcher to test the significance of each individual effect on the study variables. An example of this would be whether there was a relationship between high specialists and each of the individual effects of Access to the Recreation Site. If a significant relationship between high specialists and the most restrictive amount of access were found, then high specialists most likely prefer areas with very limited access. The Model Selection Loglinear Analysis also creates an estimate for parameters in the test to show which individual effects have a strong or weak relationship with the other individual variable effects.

Each variable has only $k - 1$ variables effects, where k is the number of possible values for that variable. This

is because the last variable effect is redundant and offers no effect to the parameter estimates. The sign of the coefficient in the estimates of parameters indicates the direction of the relationship, and its absolute value indicates the strength, with larger absolute values indicating stronger relationships. Therefore, a positive coefficient with an absolute value close to one indicates a very strong, positive relationship and a negative coefficient with an absolute value close to zero indicates a weak, negative relationship.

Summary

This chapter began by discussing the hypotheses proposed in this study. The next section provided an overview of the study sites used in this thesis. Finally, this chapter also presented sections on the data collection instrument, sampling procedures, and types of analysis used for the results of this study. In the next chapter, results of the data will be analyzed and presented for discussion.

CHAPTER THREE: RESULTS

This chapter focuses on the results of this study. The first section looks at preliminary research that was conducted to narrow the focus of setting preferences to the ROS. The chapter will then discuss the study participants, followed by visitor characteristics and an overview of the specialization index. Finally, it examines the analysis conducted between specialization and the setting preferences, such as the ROS, ROS factors, and general setting questions.

Preliminary Research

In the spring of 2000, I conducted a pilot study to narrow the focus on what aspects of the setting displayed some significance between specialization level and setting preferences. All individuals, 18 years or older, were contacted at the beginning or end of the visit to four climbing areas in West Virginia. I chose the four areas because they represent a wide range of recreational setting opportunities as defined by the ROS (Brown, Driver, & McConnell, 1978). Of the 35 participants contacted, 32 agreed to participate in the study. Study participants filled out questionnaires on-site, and returned them to myself before leaving the climbing area. By completing the questionnaire, study participants reported their level of

specialization, climbing preferences, setting preferences, motivations, and demographics.

I analyzed the data following the procedures published by Wellman, Roggenbuck, and Smith (1982) and described later in this thesis. Two variables were significantly ($\alpha < .05$) associated with the level of specialization. Those two variables include the ROS class and the importance of setting to the overall climbing experience. These findings might indicate that the level of specialization does affect the setting choice of the participant, at least in regard to the ROS classes. The association between the importance of setting to the overall climbing experience and specialization level also might suggest that setting is a more important factor in the satisfaction of highly specialized climbers and not as important for low specialized climbers. If specialization affects climbers' setting preferences, it would be critical for recreation resource managers to accommodate those levels to enhance the satisfaction of the participants. The results of the preliminary study were used to narrow the focus to the current study.

Study Participants

I contacted rock climbers visiting three climbing areas in West Virginia and asked them to participate in the

study during April and May of 2001. A total of 215 visitors, 18 years of age and older, were systematically contacted at the beginning or end of their visit to the three study sites. Of the 215 climbers contacted, 207 agreed to participate in the study and returned a questionnaire before leaving the climbing area (Table 1).

The questionnaires were completed through on-site visits to various climbing areas in West Virginia. These visits were randomly conducted in April and May of 2001 and included data collected at various days of the week. Approximately 88 questionnaires were completed at the Seneca Rocks-Spruce Knob National Recreation Area. At the New River Gorge National Scenic River, 78 questionnaires were completed, while at Cooper's Rock State Forest, approximately 41 questionnaires were filled out by climbers (Table 2). All questionnaires were completed by participants who were climbing the day the data were collected. I collected 99 questionnaires during mid-week and 108 were on the weekend (Table 3).

Table 1 Response rates of on-site questionnaire

Attempted Responses	Actual Responses	Response Rate %
215	207	96.3

Table 2 Questionnaires collected by study sites (N=207)

Study Sites	n	Percent of Total
Seneca Rocks-Spruce Knob, WV	88	42.5
New River Gorge, WV	78	37.6
Cooper's Rock State Forest, WV	41	19.8

Table 3 Time of data collection during week (N=207)

Time of Week	n	Percent of Total
Mid-Week	99	47.8
Weekend	108	52.2

Visitor Characteristics

Of the climbers who completed the survey, approximately 150 participants were male (72.8 %) and 56 were female (27.2 %) (Table 4). One survey was left blank on this question. Ninety-three percent of all respondents have taken some college courses, with approximately 76.4 percent completing their college education and 29 percent

holding advanced degrees (Table 5). The income of the respondents was widely varied. Approximately 24.2 percent of the participants' household income is greater than 70,000 dollars, with those in the 45 to 70,000 range next (22.2 %), and under 15,000 dollars income came in third, with 19.8 percent (Table 6). The climbers who completed the questionnaire came from many different states and countries. The state with the most climbers in the study was Virginia, followed by Ohio, West Virginia, Pennsylvania, and Maryland. Approximately 17 states and districts were represented in the study, many in the eastern US. Four countries were also represented by respondents in the study. The climbers preferred top-rope climbing first (81.8 %), followed by traditional climbing (80.0 %), gym climbing (71.8 %), sport climbing (69.5 %), and bouldering (67.7 %). Other forms of climbing enjoyed by the participants in this study include ice climbing, alpine mountaineering, and aid climbing respectively.

Table 4 Gender of participants (N=206)

Gender	n	Percent of Total
Male	150	72.8
Female	56	27.2

Table 5 Education level of participants

Education Level	n	Percent of Total
College Grad	97	47.0
Doctorate	18	8.7
High School	8	3.9
Masters	43	20.9
Some College	35	17.0
Some High School	3	1.5
Technical	2	1.0
Total	206	100.0

Table 6 Income level of respondents

Income Level	n	Percent
No Response	9	4.3
Under 15,000	41	19.8
15,000-24,999	18	8.7
25,000-34,999	21	10.1
35,000-44,999	22	10.6
45,000-69,999	46	22.2
Over 70,000	50	24.2
Total	207	100.0

Specialization Index

The seven variables used to create the specialization index were added together to create an aggregate score. The aggregate score was then ranked ordinally from one to four, with one being high specialists and four being low specialists. Forty-three respondents were ranked as high specialists, 106 were classified as moderate specialists, and 58 were classified as low specialists (Table 7).

Table 7 Classification of participants into levels of specialization

Specialization Level ^a	n	Percent
1	43	20.8
2	53	25.6
3	53	25.6
4	58	28.0
Total	207	100.0

^a Specialization Level is an ordinal scale ranging from 1 to 4 (1= high and 4= low).

I compared the specialization index with demographics to determine any trends. A comparison of recreation specialization and gender reveals that males have an even distribution among the four specialization levels, while females have an uneven distribution towards the low end of the specialization scale (Table 8). An examination of specialization levels and education reveals no significant trends (Table 9).

Table 8 Comparison of Specialization Level and Gender

Gender	Specialization Level ^a				Total
	1	2	3	4	
Male	41	46	37	26	150
Female	1	7	16	32	56
Total	42	53	53	58	206

^a Specialization Level is an ordinal scale ranging from 1 to 4 (1= high and 4= low).

Table 9 Comparison of Specialization Level and Education Level

Education Level	Specialization Level ^a				Total
	1	2	3	4	
College Grad	22	23	25	27	97
Doctorate	4	6	5	3	18
High School	1	3	1	3	8
Masters	11	10	11	11	43
Some College	5	9	7	14	35
Some High School	0	2	1	0	3
Technical School	0	0	2	0	2
Total	43	53	53	58	207

^a Specialization Level is an ordinal scale ranging from 1 to 4 (1= high and 4= low).

Specialization and ROS Classes

I examined the association between the level of specialization and the ROS classes using a two-tailed bivariate (Kendall's tau-b) correlation to determine the significance of the Recreation Opportunity Spectrum with the level of specialization (Table 10). The results show that there was no significant correlation ($p < .05$) (Table 11).

Table 10 Cross tabulations of specialization level and preference of ROS classes

Specialization Level ^a	P	SP	R	C	MU ^b	Total
1	16	17	8	1	1	43
2	19	20	12	2	0	53
3	13	18	19	2	1	53
4	19	29	8	2	0	58
Total	67	84	47	7	2	207

^a Specialization Level is an ordinal scale ranging from 1 to 4 (1= high and 4= low).

^b P= Primitive, SP= Semi-Primitive, R= Rustic, C= Concentrated, and MU= Modern Urbanized.

Table 11 Bivariate (Kendall's tau-b) correlation of specialization level and ROS classes (N=207)

ROS Classes vs. Specialization Level	Correlation	
	Value	p
	.014	.801

Specialization and Different Climbing Areas

The next variables examined in the analysis were the correlation between the level of specialization and number of different areas the participant prefers to climb (Table 12). I conducted a two-tailed bivariate (Kendall's tau-b)

correlation between specialization level and the number of different areas the respondent climbs frequently. The results show that there was a positive correlation with a level of significance of $p < .05$, indicating that preferences for the number of different areas to climb increases as specialization level increases (Table 13).

Table 12 Cross tabulations of specialization level and the number of different climbing areas preferred

Specialization Level ^(a)	Number of Climbing Areas Preferred			Total
	Many different areas	Several different areas	The same area	
1	21	21	1	43
2	14	33	6	53
3	10	35	8	53
4	5	35	16	56
Total	50	124	31	205

(a) Specialization Level is an ordinal scale ranging from 1 to 4 (1= high and 4= low).

Table 13 Bivariate (Kendall's tau-b) correlation between specialization level of climbers and the number of different climbing areas preferred (N=205)

Specialization Level vs. Number of Different Climbing Areas Preferred	Correlation Value	p
	.323	.000

Specialization and Importance of Setting

The next variables examined in the analysis were the correlation between the level of specialization and the importance of the setting to the overall climbing experience (Table 14). A two-tailed bivariate (Kendall's tau-b) correlation was conducted between specialization level and the importance of the setting to look for significant relationships. The results show that there was a positive correlation with a level of significance below $\alpha = .05$, indicating that the importance of the setting increases as specialization levels increase (Table 15).

Table 14 Cross tabulations between specialization level and the importance of setting to the overall climbing experience

Specialization Level ^b	Importance of Setting ^a					Total
	1	2	3	4	5	
1	23	18	2	0	0	43
2	16	29	6	2	0	53
3	17	29	6	1	0	53
4	19	29	6	3	1	58
Total	75	105	20	6	1	207

^a Importance of Setting is a Likert Scale from 1 to 5 (1= Very Important and 5= Not Important).

^b Specialization Level is an ordinal scale ranging from 1 to 4 (1= high and 4= low).

Table 15 Bivariate (Kendall's tau-b) correlation between specialization level of climbers and the importance of setting to overall climbing experience (N=207)

Specialization Level vs. Importance of Setting	Correlation Value	p
		.126

Specialization and Naturalness of the Area

The next variables examined in the analysis were the correlation between the level of specialization and one of the ROS factors, the naturalness of the area (Table 16). A two-tailed bivariate (Kendall's tau-b) correlation was conducted between specialization level and the naturalness of the area. The results show that there was no correlation with a level of significance below $\alpha=.05$, indicating there is no relationship between specialization level and the naturalness of the area (Table 17).

Table 16 Cross tabulations between specialization level and naturalness of the recreation area

Specialization Level ^b	Naturalness of the area ^a					Total
	1	2	3	4	5	
1	12	20	11	0	0	43
2	13	24	15	0	1	53
3	11	24	16	2	0	53
4	8	40	9	1	0	58
Total	44	108	51	3	1	207

^a Naturalness Factors is an ordinal scale from 1 to 5 (1= Primitive and 5= Modern Urbanized)

^b Specialization Level is an ordinal scale ranging from 1 to 4 (1= high and 4= low)

Table 17 Bivariate (Kendall's tau-b) correlation between specialization level of climbers and the naturalness of the recreation area (N=207)

Specialization Level vs. Naturalness of the Recreation Area	Correlation Value	p
	.026	.644

Specialization and Access to the Climbing Area

Another ROS factor examined in the analysis was the correlation between the level of specialization and access to the climbing area (Table 18). A two-tailed bivariate (Kendall's tau-b) correlation was conducted between specialization level and access to the climbing area to look for significant relationships. The results show that there was a positive correlation with a level of significance below $\alpha = .05$, indicating that preference levels for less access increases as specialization levels increase (Table 19).

Table 18 Cross tabulations between specialization level and access to the climbing area

Specialization Level ^b	Access to the Climbing Area ^a				Total
	1	2	3	4	
1	20	21	2	0	43
2	19	30	2	2	53
3	9	36	2	6	53
4	18	29	4	6	57
Total	66	116	10	14	206

^a Access to the Climbing Area is an ordinal scale from 1 to 4 (1= Little Access and 4= All Access).

^b Specialization Level is an ordinal scale ranging from 1 to 4 (1= high and 4= low).

Table 19 Bivariate (Kendall's tau-b) correlation between specialization level of climbers and the access to the climbing area (N=206)

Specialization Level vs. Access to the Climbing Area	Correlation Value	p
	.159	.011

Specialization and Contact with Other Users

The next ROS factor examined in the analysis was the correlation between the level of specialization and contact

with other recreational users (Table 20). I conducted a two-tailed bivariate (Kendall's tau-b) correlation between specialization level and contact with other recreational users to look for significant relationships. The results show that there was no correlation with a level of significance below $\alpha = .05$, indicating there is no relationship between specialization level and contact with other recreational users (Table 21).

Table 20 Cross tabulations of specialization index level and the amount of contact with other recreational users

Specialization Level ^c	Amount of Contact with Other Users ^{a,b}				Total
	1	2	3	5	
1	26	14	3	0	43
2	35	13	5	0	53
3	27	18	8	0	53
4	35	13	9	1	58
Total	123	58	25	1	207

^a Amount of Contact is an ordinal scale from 1 to 5 (1= little/no contact and 5= high contact).

^b Missing value of 4 indicates that no participants marked that response.

^c Specialization Level is an ordinal scale ranging from 1 to 4 (1= high and 4= low).

Table 21 Bivariate (Kendall's tau-b) correlation between specialization level of climbers and the amount of contact with other recreational users (N=207)

Specialization Level vs. the Amount of Contact With Other Recreational Users	Correlation Value	p
	.055	.363

Specialization and Management of the Recreation Area

The fourth ROS factor examined in the analysis was the correlation between the level of specialization and management of the recreation area (Table 22). A two-tailed bivariate (Kendall's tau-b) correlation was conducted between specialization level and management of the recreation area. The results show that there was a positive correlation with a level of significance below $\alpha = .05$, indicating that preferences for management decreases as specialization level increases (Table 23).

Table 22 Cross tabulations between specialization level and management of the recreation area

Specialization Level ^b	Management of the Recreation Area ^a					Total
	1	2	3	4	5	
1	13	22	6	0	1	42
2	13	31	6	2	0	52
3	9	25	16	1	1	52
4	8	28	18	3	1	58
Total	43	106	46	6	3	204

^a Management of the Recreation Area is an ordinal scale from 1 to 5 (1= Little/No Management and 5= Highly Managed).

^b Specialization Level is an ordinal scale ranging from 1 to 4 (1= high and 4= low).

Table 23 Bivariate (Kendall's tau-b) correlation between specialization level of climbers and the management of the recreation area (N=204)

Specialization Level vs. the Management of the Recreation Area	Correlation Value	p
	.198	.001

Specialization and Amount of Facilities at Recreation Site

The fifth and final ROS factor examined in the analysis was the correlation between the level of

specialization and the amount of facilities available at the recreation site (Table 24). I conducted a two-tailed bivariate (Kendall's tau-b) correlation between specialization level and amount of facilities available at the recreation site. The results show that there was no correlation with a level of significance below $\alpha = .05$, indicating there is no relationship between specialization level and amount of facilities available at the recreation site (Table 25).

Table 24 Cross tabulations between specialization level and amount of facilities at the recreation site

Specialization Level ^b	Amount of Facilities at the Recreation Site ^a				Total
	1	2	3	4	
1	22	12	8	1	43
2	26	19	4	4	53
3	27	17	9	0	53
4	22	23	12	1	58
Total	97	71	33	6	207

^a Amount of Facilities at the Recreation Site is an ordinal Scale from 1 to 4 (1= Little/No Facilities and 4= Many Facilities).

^b Specialization Level is an ordinal scale ranging from 1 to 4 (1= high and 4= low).

Table 25 Bivariate (Kendall's tau-b) correlation between specialization level of climbers and the amount of facilities at the recreation site (N=207)

Specialization Level vs. the Amount of Facilities at the Recreation Site	Correlation Value	p
	.065	.285

Model Selection Loglinear Analysis

I conducted a Model Selection Loglinear Analysis on the level of specialization and setting preferences to see whether there are any associations between individual values of level of specialization and individual values of the setting preferences examined in this study. The analysis found that there were no significant three-way relationships between the level of specialization and setting preferences, meaning that there was no relationship between specialization and a combination of any two setting preferences variables. There were, however, several two-way relationships found to be significant.

Approximately two setting preferences were found to have a significant relationship with the level of specialization (Table 26). The results show that the amount of different areas the rock climber frequents and the amount of access to the recreation site both showed

partial associations with $\alpha = .05$. The Model Selection Loglinear Analysis also creates an estimate for parameters in the test to show which individual effects have a strong or weak relationship with the other individual variable effects. Each variable has only $k - 1$ variables effects, where k is the number of possible responses for that variable. This is because the last variable effect is redundant and offers no effect to the parameter estimates. The sign of the coefficient in the estimates of parameters indicates the direction of the relationship, and its absolute value indicates the strength, with larger absolute values indicating stronger relationships. Therefore, a positive coefficient with an absolute value close to one indicates a very strong, positive relationship and a negative coefficient with an absolute value close to zero indicates a weak, negative relationship.

The results show that high specialists have a strong positive relationship with a high number of different climbing areas (Table 27). It also showed that high specialists have a strong positive relationship with climbing areas with low access (Table 28). In addition, the moderate specialists have a weak positive and negative relationship with number of different climbing areas and access to the climbing area variables, respectively.

Table 26 Significant tests of partial associations between level of specialization and setting preferences

Effect Name	Degrees of Freedom	Partial Chi-square	p	Iterations
Specialization Level vs. Number of Different Climbing Areas	6	29.334	.001	2
Specialization Level vs. Access to the Climbing Area	9	20.407	.0156	2

Table 27 Estimates for parameters of level of specialization and the number of different climbing areas preferred

Specialization Level ^a	Number of Different Climbing Areas ^b	Coefficient	Standard Error	Z-Value ^c
1	1	.602	.325	1.853
1	2	-.272	.335	-.812
2	1	.163	.293	.555
2	2	.080	.279	.555
3	1	-.127	.305	-.415
3	2	.040	.278	.142

^a Specialization Level is an ordinal scale ranging from 1 to 4 (1= high and 4= low).

^b Number of Different Climbing Areas is an ordinal scale from 1 to 3 (1= many different areas and 3= the same area).

^c Z-Value indicates a strong positive relationship between variables.

Table 28 Estimates for Parameters of Level of Specialization and Access to the Climbing Area

Specialization Level ^a	Access to the Climbing Area ^b	Coefficient	Standard Error	Z-Value ^c
1	1	.305	.339	.901
1	2	-.000	.336	-.000
1	3	.139	.397	.349
2	1	.139	.334	.416
2	2	.033	.329	.099
2	3	-.014	.393	-.035
3	1	-.375	.335	-1.120
3	2	.267	.301	.887
3	3	-.237	.402	-.590

^a Specialization Level is an ordinal scale ranging from 1 to 4 (1= high and 4= low).

^b Access to the Climbing Area is an ordinal scale from 1 to 4 (1= Little Access and 4= All Access).

^c Z-Value indicates a strong positive relationship between variables.

Summary

The significance of the results from this study was reported in this chapter. The first section provided an overview of the preliminary research that was conducted to narrow the focus of setting preferences to the ROS. The chapter reported the results of the data collection using sections on study participants, visitor characteristics and

an overview of the specialization index and comparisons with visitor characteristics. The results ended by examining the analysis conducted between specialization and the setting preferences, such as the ROS, general setting questions, and ROS factors. The study found that four setting variables were significant using Kendall's tau-b correlation and two were significant using Model Selection Loglinear Analysis. The final chapter will discuss the meanings of these results and explain the benefits of the research.

CONCLUSIONS

This chapter provides explanations for the results obtained, hypotheses tested, and gives limitations of the study. Implications of the research that is relevant to land managers and addresses areas of future research are also discussed.

Visitor Characteristics

The visitor characteristics (gender, income, education level, and climbing type preference) of this study are similar to the distribution of visitor characteristics in previous climbing studies (Waldrup & McEwen, 1994). Although this seems to indicate that the respondents of this study are representative of the climbing community in general, making inference beyond the sample population should be done with some caution. It is unclear how other visitor, trip, and site characteristics might influence the study findings.

Specialization and ROS Classes

The findings in this study, with respect to the hypotheses, were mixed. The results suggest that there is no relationship between ROS classes and specialization level. This finding is consistent with the hypothesis (H1) proposed about specialists, in that there is no correlation between specialization level and ROS classes. It can be

inferred through these results that the ROS does not adequately describe setting preferences for climbers, as it relates to the climbing resource. This result was similar to findings by Merrill and Graefe (1997). They found that specialized climbers were more interested in the specific setting and route attributes than the general setting attributes of the area.

Specialization and Different Climbing Areas

The amount of different climbing areas the participant frequents is significantly associated with the level of specialization. This finding suggests that highly specialized climbers tend to frequent more climbing areas than those participants who are less specialized, perhaps because of the greater experience (number of years climbing, number of days climbing per year, and higher skill level) that the highly specialized participants possess. That is, highly specialized climbers explore many different areas of varying difficulty levels to keep them challenged and motivated.

These results were antecedent to the hypothesis (H2) proposed in this study, in that there was a correlation between specialization level and the amount of different areas frequented. Some of the previous research was closely related to the findings of this study. A study by

Schreyer, Lime, and Williams (1984) indicates that the amount and type of experience is important in determining level of experience. Another study of specialization by Hollenhorst (1989) concluded that experts weren't as likely to prefer more natural areas than those who were considered novice. Finally, a study on climbing specialization by Merrill and Graefe, (1997) indicated that as specialization increased, specific setting and route attributes became more important for climbers. These previous findings, along with the current study, show that there is a correlation between specialization and different climbing areas.

Specialization and Importance of Setting

The importance of setting to the climbing experience indicates that those who are more specialized feel that the setting is important in relation to the overall climbing experience, while those who are less specialized do not feel that setting is as important as other factors in the overall climbing experience. These results did not support those hypothesized in this study (H3) in that there is no correlation between the specialization index level and the importance of the setting to the climbing experience.

This is significant because it shows that there is a relationship between the level of specialization and the

importance of the setting to the participant's overall experience. That means that highly specialized climbers feel that having the right setting while recreating is very important, while less specialized climbers feel that the importance of the setting is not as important as other factors, such as social interaction with other climbers. This corresponds with previous research by Bryan (1977), Hollenhorst (1989), and Merrill and Graefe (1997). These studies have all found that as recreation specialization increases, so does the importance of the setting to the participant's experiences.

Specialization and Naturalness of the Area

In the fourth hypotheses (H4) addressing the factors of the ROS and climbing specialization, there was no significant correlation between highly specialized climbers and a preference for natural settings. Highly specialized climbers did not have different ROS class preferences from climbers who were of low specialization in regard to the naturalness of the general setting at the climbing area. These results were antecedent to what was proposed with the study in that highly specialized climbers would prefer more natural, remote settings, while less specialized climbers would prefer more social settings. Perhaps this is due to

a problem that was encountered in the study by Wellman, Roggenbuck, and Smith (1982).

Wellman et al., (1982) found that there was no relationship between specialization and environmental preferences and attitudes, possibly because those who were found to be less specialized in the particular activity often were more highly specialized in another outdoor activity that holds similar values. The traditional measurement of specialization takes into account only specialization in the particular activity and not the degree of specialization in outdoor recreation as a whole. Another reason could be the lack of climbing areas in the eastern United States that trend towards the Primitive side of the ROS. If climbers do not have Primitive areas available to them, as much as the eastern United States is considered Semi-Primitive or Rustic, then they will prefer those areas that they can climb at near their home.

Specialization and Access to the Climbing Area

With the ROS factor relating to the amount and ease of access to the climbing area, as related to the general setting, a positive correlation was identified between specialization and different levels of access. This means that highly specialized climbers prefer areas where access is limited to foot travel only, whereas less specialized

climbers tend to prefer areas where access is much easier, such as roads and easy trails.

This finding supports the notion that differing levels of climbers have different patterns of behavior regarding access to climbing areas, creating a need for multiple levels of access in the management of a climbing area. This is similar to findings by Virden (1986) and Williams and Huffman (1986). Virden (1986) found significant relationships between the level of specialization and the type of environmental setting preferred by hikers. An important aspect of this research might suggest that specialists have more exacting physical setting demands, allowing managers and researchers to better understand the motivations of some recreation participants. Williams and Huffman (1986) conducted research on access and specialization. They found that access to an area tends to decrease as the level of specialization increases and that highly specialized individuals tend to have a preference for more challenging trails and access to recreation areas.

Specialization and Contact with Other Users

Contact with other users of the recreation area was a third ROS factor examined in this study. No positive correlation was found between the specialization index level and preferences for the amount of contact with other

users of the setting. There was no relationship developed between the level of specialization and the amount of people climbers like to see in a visitor day. In fact, the results show that all climbers, regardless of specialization index level, are sensitive to seeing large numbers of people while climbing (Table 20). These results support an idea that all climbers are perceptive to issues of crowding and that they prefer small, social contexts. Perhaps this is because climbing is a fairly individualistic sport and interaction with others may detract from the setting and allow for issues of crowding to take place. This is antecedent to the results found by Hollenhorst (1989) who found that the use of expertise as a measurement of climbing specialization affects where a participant climbs because of the density of climbers in the area.

Specialization and Management of the Recreation Area

The fourth factor of the ROS examined was the amount of visible management at the recreation site and its values compared with the level of specialization. The amount of management at the climbing setting had a positive correlation with the specialization index level of the participants in this study. This means that as the level of specialization increases, so does the sensitivity

towards visitor regulations and information facilities. A highly specialized climber, according to the results, would prefer recreating in areas where there are little to no visitor regulations and there are no information facilities to guide visitors to the management of the area. A climber with lower specialization would enjoy areas with some regulations and information facilities present to help direct them into areas where their recreation opportunities could be optimized.

*Specialization and Amount of Facilities at the
Recreation Site*

The fifth and final ROS factor examined was the amount and type of facilities present at the recreational site. The results showed that there was no significant relationship between the specialization index level of the participant and the facilities at the recreation site. This indicates that high and low specialized climbers do not have a preference towards whether a recreation area has modern or primitive facilities present. Perhaps this is similar to the attribute regarding naturalness at the recreation site in that climbers in the eastern United States have a relatively homogenous availability of different ROS settings available to them. This could

affect the results from a lack of different levels of facilities that the respondents have available to them.

Model Selection Loglinear Analysis

I conducted additional analysis on the level of specialization and setting preferences using a model selection loglinear analysis, which analyzes the variables and gives partial associations with the individual effects of those variables (SPSS, 1999). The results of this analysis, in regard to the hypothesis, were mixed.

The analysis shows that the amount of different areas the rock climber frequents and the amount of access to the recreation site both showed partial associations with the specialization index level, while the other setting preferences had no significant relationship. This indicates that certain types of specialists have a significant association with some individual effects of the amount of different areas a climber frequents and the amount of access to the climbing site. Using the estimates of parameters in the model selection loglinear analysis, the analysis broke it down even further by telling us which individual values have a significant relationship between the level of specialization and the two setting variables. As such, the results show that high specialists have a

positive strong relationship with a high number of different climbing areas.

It also showed that high specialists have a strong positive relationship with climbing areas with low access. Moderate specialists have a weak positive and negative relationship with number of different climbing areas and access to the climbing area variables. This indicates that with regard to the amount of different climbing areas a climber frequents, a high specialist would prefer to go to many different areas. That is, highly specialized climbers explore many different areas of varying difficulty levels to keep them challenged and motivated.

These results compliment previous research that examined the level of experience and settings (Schreyer, Lime & Williams, 1984; Hollenhorst, 1989; Merrill & Graefe 1997). Their research showed that as a participant became more specialized, the requirements for challenge and motivation increased. An effective way to keep the participant at that stage, would be for the participant to try new areas, which may involve new skills and techniques.

The results also indicate that high specialists prefer to climb at areas where the access to the area is low, such as foot travel. This allows the climber to escape less specialized climbers and go to areas where the commitment

is high. If a climber were injured in a low access area, the difficulty of leaving the climbing area is high. This is similar to findings by Schreyer, Lime and Williams, (1984); Virden, (1986); Virden and Schreyer, (1988); and Williams and Huffman, (1986).

The model selection loglinear analysis results also showed that moderate specialists have no preference towards a certain level of access or the amount of areas they visit. This seems to indicate that moderate specialists are not as exacting in their demands as high specialists and that their level of specialization has not reached a point where expectations must be met for the participant to achieve a state of satisfaction. This follows along the original research conducted by Bryan (1977) in which specialists progress or develop along a continuum and that there are certain delineations, such as technique setting specialists, that can be established.

Limitations

There could be a number of factors that affect the results of this study in a way that makes some variables insignificant with the specialization index. One factor could be the sample size. With a relatively low number of respondents, there could be bias because of lack of adequate information. The number of respondents could not

be representative of the climbing community, and thus, would not reflect the true nature of climbers. This could affect the study by not representing the entire continuum in the sample.

Another potential limitation of the study is that the participants did not represent the climbing population. If the participants were more or less specialized than the average climbing population, then this could skew the results to one end of the spectrum or the other.

Another factor that could distort the results of this study was the areas that were sampled. The areas that were sampled did not truly represent all ranges of the ROS. The climbers who climb in urban and primitive settings were excluded, which may affect the results. It could create a bias on urban and primitive climbers who prefer to climb only in those settings. If the participants were more likely to prefer more remote or more urbanized settings than the average climber was, then the results would be skewed in that direction. Since there is a lack of settings in the urban and primitive settings in the eastern United States, this could affect the results of the climbers in regard to climbing in those areas due to a potential lack of familiarity with those types of settings.

A fourth limitation to this study was the lack of qualitative information from this study. The study primarily used quantitative data to come up with the results. Since previous research has shown that some respondents answer more truthfully to qualitative answers, this can create bias among some study participants. The type of specialization index used in this study may also allow some bias to enter the study. The creation of the specialization index level in this study may not fully grasp the level of specialization of the study participants. However, this method has been the most widely used to measure specialization and alternative methods of measurement need more research to fully understand the mechanisms of use.

Finally, there could be bias associated with the respondents and their overall level of specialization in all general outdoor recreation activities. If a person is of low specialization in climbing, but of high specialization in another similar activity, such as hiking, then they may exhibit similar values in regard to setting preferences as one who is highly specialized in climbing (Williams, 1985). This can affect their responses to the questionnaire regarding their specialization level and their responses to the ROS and its attributes.

The lack of a reliable method of creating a specialization index level, that doesn't include bias associated with self-reporting of participants, has been a weakness associated with the theory of recreation specialization. Participants may provide answers that may not accurately reflect their specialization levels. This could be due to a number of factors, such as fear, ego, and any number of social factors. Until a reliable method of specialization index level measurement can be developed, it will continue to be a weakness of participant studies using specialization.

Management Implications

While the results of this study have been mixed regarding the hypotheses tested, the findings in this study suggest that specialization can play some sort of role in what type of setting is preferable for climbers. While the use of the ROS as a way of classifying climbing areas to suit climber's needs has been shown to not have any significance, the correlation between specialization and the importance of the setting to the overall climbing experience shows that climbers do have a proclivity towards particular setting preferences based on their specialization index level.

Managers can use the specific ROS factors, such as access and management in this study, to determine the preferences that different levels of specialists have when it comes to the setting. For example, this study found that the access and amount of management at the recreation site are greatly influenced by specialization. Recreation managers can use this information to change access levels to certain types of climbing areas and to differ the amount of visible management at those areas. This could go a long way to making a more positive experience for all climbers who use their recreation areas. By knowing the setting preferences of the participants in their area, managers can determine issues that are important to the climbers in their area, such as sensitivity to access and management of the area. By developing an inventory of the different resources available to climbers in their area, managers can make better decisions on the use of the resources. They can use the inventory to match user preferences and their behaviors to their preferred setting and allow the participant to have a more satisfying experience.

Implications for Future Research

There are still many questions that need to be addressed regarding specialization and setting preferences in the future. One such area that could be addressed in

future research is the idea of a general outdoor recreation level of specialization. This could address any bias that may be associated with some research in specialization, as having previously been discussed by Williams (1985). If a specialization index could be created that could take into account multiple specialization levels of outdoor recreation activities, then a potential bias with specialization may be eliminated.

More research also needs to be addressed on specialization and setting preferences in other activities. A better understanding of all activities and setting preferences will allow for better management of the resources for all recreation participants, which is the overall goal of recreation management research. This allows for as many recreation participants as possible to have a quality recreation experience.

Finally, another area of research would be a long-term experiment looking at differences in the participant while the level of specialization changes over time. A study of recreational users in a long-term psychological study would be much more beneficial to the researcher and manager in determining typical behaviors at certain specialization levels. This would provide a more concrete measurement of how recreation participants behave at different stages of

development and allow managers to accommodate those patterns.

This chapter discussed the results and compared them to the hypotheses proposed in this study. The hypotheses of the study stated that there was no relationship between the specialization index level and all complete or partial setting preferences, such as the ROS, importance of setting, amount of different areas, and ROS factors. This chapter then provided explanations for the results obtained and gave limitations of the study, implications of the research that is relevant to land managers and addresses areas of future research.

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2001 Climbing Survey

Dear Climber:

Thank you for taking the time out to fill out this questionnaire. The questions in this study will be used to determine the areas climbers prefer to go to when climbing. It should take about 15 to 20 minutes to complete this questionnaire. Participation in the survey is strictly voluntary and the surveys will be kept confidential. Please fill out the survey to the fullest extent. Thank you for your time in completing this survey.

George M. Weekley III
WVU Division of Forestry

1. How many years have you been climbing? _____
2. Think of your most active year of climbing in the last five years. How many days did you climb that year? _____
3. Estimate your current retail value of the climbing equipment that you own? _____
4. How would you rate your climbing ability?
 Expert Advanced Intermediate Novice
5. What is the highest level that you have ever climbed? (American or Yosemite climbing scale, Ex. 5.10b) _____
6. Have you ever taken a climbing course in the last five years?
 Yes No
7. How much has your life been influenced by your involvement in climbing?
 Almost totally A large part Some
 Almost none None
8. If climbing has influenced your life, please indicate in what way? (Ex. Moving to be near a climbing area)

9. Is climbing your favorite outdoor recreation activity?
 Yes No
If no, what is your favorite outdoor recreation activity? (Ex. Whitewater rafting)

10. Are you a member of any climbing organizations or clubs?
 Yes No

11. Do you subscribe to or read any climbing magazines or books?

Yes No

12. With whom do you usually go climbing? (Check one)

Club trips With my family
 With fellow employees or business associates Alone, by myself
 With several close friends
 Other-Please specify _____

We would like to ask you some questions about the general setting you most prefer to engage in while climbing. The following questions refer to your attitudes and preferences towards climbing areas.

1. On what type of areas have you climbed in the past two years? Check all that apply

Gym climbing Sport-climbing Top-rope
 Traditional (free) climbing Traditional (aid) climbing Ice climbing
 Alpine Mountaineering Bouldering

Which of these do you prefer and why?

2. What type of setting do you prefer when you recreate in the outdoors? Check all that apply

Primitive – An area characterized by having an unmodified natural environment, with a low concentration of users, and has no evidence of human-induced restrictions or facilities. There is a great opportunity for isolation from others and no motorized use is allowed.

Semi-primitive – An area characterized by having a largely unmodified natural environment, with a somewhat low concentration of other users, and minimum evidence of human-induced restrictions and/or facilities. There is some opportunity for isolation from other users. Motorized use may or may not be allowed.

Rustic - An area characterized by having a slightly modified natural environment, with evidence of humans in the natural setting. The area has a moderate concentration of users and has moderate evidence of human-induced restrictions and/or facilities. There are equal opportunities for isolation and for interaction with other groups. Motorized use is often permitted in certain areas.

Concentrated – An area characterized by having a substantially modified natural environment, with high evidence of humans in the setting. The area has a high concentration of users and high evidence of human-induced restrictions and/or facilities. There are high opportunities for interaction with other groups and intensified motorized use is often available.

Modern Urbanized – An area characterized by having a largely urban environment, with a very high evidence of humans in the setting. The area has a very high concentration of users and human-induced restrictions and/or facilities are numerous. There are very high opportunities for interaction with other groups and motorized use is predominant.

Which of these do you prefer and why?

What do you feel is most important about the area that you checked above and why?

3. In general, when you go climbing, do you usually go to? (Check One)
 The same area Several different familiar areas
 Different areas fairly often

4. How important is the type of setting on which you go climbing to your overall experience?
(Check One)

Very important Important Of some importance Of little importance
 Not important at all

We would like to ask you a few specific questions regarding different aspects of the setting you prefer to climb. These questions are necessary to determine what about the area you prefer to climb is important

5. Naturalness of the Area – Circle 1 of the 5 areas that best describes the area you most prefer

<u>Setting</u>	<u>Setting Description</u>
1.	An undisturbed natural area with no evidence of humans
2.	A largely, undisturbed natural area
3.	An area that is somewhat modified, but appears natural.
4.	A substantially modified area with both human-made and natural features such as rural or agricultural landscapes
5.	An area where roads, buildings, and power lines clearly dominate the landscape

What do you feel is most important about the area that you circled above and why?

6. Access to the Recreation Site – Circle 1 of the 4 areas that best describes the area you most prefer

<u>Setting</u>	<u>Setting Description</u>
1.	No motorized use allowed, area is accessible only by hiking cross-country
2.	Accessible only by non-motorized trails, mountain bikes, on foot
3.	Accessible on motorized trails and primitive roads (off-highway vehicles)
4.	Accessible by all vehicles

What do you feel is most important about the area that you circled above and why?

7. Contact with Other People – Circle 1 of the 5 areas that best describes the area you most prefer

Setting	Setting Description
1.	Very little contact with other people (under 6 groups per day)
2.	Little contact with other people (6-15 groups per day)
3.	Moderate contact with other people (15+ groups per day)
4.	High degree of contact with other people (30+ groups per day)
5.	In constant contact with other people (large numbers of people onsite)

What do you feel is most important about the area that you circled above and why?

8. Amount of Management & Regulation– Circle 1 of the 5 areas that best describes the area you most prefer

Setting	Setting Description
1.	No on-site visitor regulation or information facilities
2.	A few visitor regulations area evident, limited information facilities are evident
3.	On-site regulations and controls are noticeable, simple information facilities are present
4.	On-site regulations and controls are numerous, more complex information facilities are present
5.	On-site regulations and controls are obvious and numerous with sophisticated information exhibits present

What do you feel is most important about the area that you circled above and why?

9. Amount and Type of Facilities – Circle 1 of the 4 areas that best describes the area you most prefer

Setting	Setting Description
1.	Very few primitive facilities such as trails and signs
2.	A few rustic facilities are available, such as tables, pit toilets, and primitive campgrounds
3.	Moderate number of facilities such as picnic areas and flush toilets
4.	Numerous facilities provided to accommodate many users, such as surfaced trails, developed campgrounds, and stores

What do you feel is most important about the area that you check above and why?

These last questions are important in helping us learn more about the people participating in this study. All of the information is STRICTLY CONFIDENTIAL and WILL NOT be associated with you as an individual.

1. Sex M ___ F ___

2. Formal education (Check One)
 - ___ Grade school
 - ___ Some high school
 - ___ High school graduate
 - ___ Technical/vocation school
 - ___ Some college
 - ___ College graduate
 - ___ Masters level
 - ___ Doctorate level

3. What is your occupation? _____

4. What is your annual household income (before taxes)? (Check One)
 - ___ Under \$15,000 ___ \$35-45,000
 - ___ \$15-25,000 ___ \$45-70,000
 - ___ \$25-35,000 ___ Over \$70,000

5. What is your marital status?
 - ___ Single
 - ___ Married
 - ___ Single with children
 - ___ Married with children
 - ___ Other, please specify _____

6. What is your state of residence? _____

7. What best describes your residence? (Check One)
 - ___ Rural
 - ___ Small town- Under 10,000 population
 - ___ Small city- 10,000-100,000 population
 - ___ Large city- 100,000-500,00 population
 - ___ Metropolitan area- 500,000 or more population

9. Is there anything else you would like to tell us about climbing and setting preferences? (Use the back if necessary)

Thank you for your time in completing this survey. If you have any issues about any of the questions, feel free to comment on the space provided in the back.

Sincerely,

George M. Weekley III

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